RI Dynamic Study in Intracranial Diseases with PHO/GAMMA III Scintillation Camera

—Analysis of Intravenous and Intracarotid Injection—

F. SHINMURA, Y. GOTO, K. TAKANASHI and T. MIWA
Department of Neurosurgery, Tokyo Medical College, Tokyo

H. MURAYAMA, K. ABE and I. OKAMOTO
Department of Radiology, Tokyo Medical College, Tokyo

Gamma scintillation camera has clinical value in diagnosis of local lesion of cerebral hemisphere, and in dynamic examination of the passage of RI tracer through the cerebral circulation.

By means of 1600 word memory system with gamma scintillation camera, focal RI concentration-ratio was calculated serially every one-minute intervals after intravenous injection, and every 0.6 second intervals after intracarotid injection. Also, serial brain scintigraphy was taken at these intervals. About 10 mCi, $^{113m}$In-FeDTPA, was injected as RI tracer in both methods.

We analyzed retrospectively these RI concentration curves as compared with post operative histological diagnosis, and tried to perform differential diagnosis of intracranial diseases.

1) Comparison between RI concentration curve and serial brain scintigraphy were performed on 60 cases after intravenous injection. Positive scintigraphy was in 52 cases.

The pathognomonic pattern was shown in A-V-M, meningioma and chronic subdural hematoma respectively. A-V-M showed a peak like sharp wave at one minute after injection. Glioma groupe showed another pattern in glioblastoma, astrocytoma and ependymoma. Also, metastatic tumor resembled to glioma group.

2) We considered these RI concentration-curves may be influenced by various factors, i.e. tumor vascularity, capillary bed, destruction of blood-brain barrier, perifocal hemostasis, etc.

Studies of RI concentration curve and serial scintangiophotography were performed on normal subjects and 25 cases with intracranial diseases every 0.6 second intervals after intracarotid injection. Maximum RI concentration time was 0.6–1.2 sec at siphon, 1.8 sec at frontal, temporal region, 2.4–3.0 sec at parietal and 3.0–3.6 sec at occipital in the normal subjects.

In the intracranial diseases, $^{113m}$In-FeDTPA rapidly accumulated in the tumor region at 1.2–0.8 sec maximally after injections.

Maximum focal RI concentration time was 2.4 sec in glioblastoma, 1.8–4.2 sec in astrocytoma, 3.6–4.2 sec in meningioma. 3.0–3.6 in metastatic tumor, 1.8 in craniopharyngioma, 1.2 sec in pituitary adenoma and 2.0 sec in cerebrovascualar diseases.

We considered these RI Dynamic Studies as described above are significant for differential diagnosis of intracranial diseases.